

**TRANS FREE HARD STRUCTURAL FAT FOR  
MARGARINE BLEND AND SPREADS**

**Description:**

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We hereby declare the invention for which we pray that a patent be granted for the product and the process by which it is performed which is particularly described by the following statements:-

10 The present invention is concerned with a Trans free hard structural fat suitable for the manufacture of low SAFA (Saturated Fatty Acid) poly/mono unsaturated margarine and spreads and fat blends for margarine/spreads using the above mentioned structural fat. This structural fat is made from selectively fractionated non-hydrogenated palm oil  
15 fraction, which is interesterified with dry fractionated non-hydrogenated palm kernel fraction to obtain hard structural fat with high yield ratios that can be economically and commercially used as structural fat for the manufacture of Trans free low SAFA, poly unsaturated/mono unsaturated margarine/spreads.

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Historically emulsified fat system in margarine/spreads has been designed to satisfy customer requirements such as significant cooling impact, a rapid sharp melt sensation, and no coated or waxy feel on the tongue. In addition, it should impart temperature cycling stability (heat stability) as  
25 well as spreadability when taken out frequently from the refrigerators are the prominent features.

To achieve these objectives, margarine fat blend is being formulated using hard stocks derived by hydrogenation of liquid oils.

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However, with the adverse effect of Trans fatty acids being published, consumers are looking for margarine / spreads with practically no Trans fatty acids.

35 This can be achieved by using fully hydrogenated fats as structural fat, which usually does not contain Trans fatty acid or very negligible amount.

Hydrogenation process is generally viewed as the main reason for the development of Trans fatty acids in oils and fats. Hence, there is a strong consumer perception against usage of and hydrogenated oil/fat in the food products including margarine / spreads.

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Hence research work is being carried out for developing margarine/spreads using no hydrogenated oils in their hard stock at the same time looking at the possibility of reducing the saturated fatty acid levels (SAFA) in the products

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### Theoretical Considerations

The hard stock contributes triglycerides especially of the trisaturated type. A certain minimum quantity of these is essential to provide the "structural fat" and to prevent oiling out of the liquid oil. From the patent literature and general experience, this minimum quantity is around 6%. More is acceptable and desirable if the amount of H<sub>3</sub> tri-glycerides, and especially tristearin, is not greater than 2% otherwise poor mouth feel will result. Hence content of H<sub>2</sub>M triglycerides is valuable, to give the structuring effect, hence the need for a lauric oil.

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When the hard stock components are interesterified, the amounts of trisaturated triglycerides in the interesterified product are determined entirely by the content of saturated fatty acids in the blend. This relationship is very critical as shown by the results:

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	% Saturated FA in the Oil blend	% Trisaturated Triglycerides After Interesterification
30	50	13
	60	22
	70	34
	80	51
	90	73

- Taking sunflower oil as the PUFA oil to be used in the blend, at a level of 80% (SAFA 10.3%) then the hard stock should not contribute more than 11.76% SAFA to the final blend considering that the SAFA content of polyunsaturated margarine should not exceed 20%. If 20% of the hard stock were used for the margarine blend along with Sunflower oil as above (a high usage level) - and if we also want a minimum of 6% trisaturated Tgs in the final blend, it can be seen from the above table that the SAFA content of the hard stock must be about 67% so that interesterified hard stock has 30% trisaturated triglyceride. Assuming only 15% hard stock is used then the SAFA content of the hard stock must be about 74%, so that it has 40% trisaturated triglyceride after interesterification. These are minimum requirements and a higher amount of trisaturated Tgs would be desirable.
- 15 The usage of hard structural fat in the blend can be 5 to 25% and the liquid oil or its blends can be 95 - 75%.